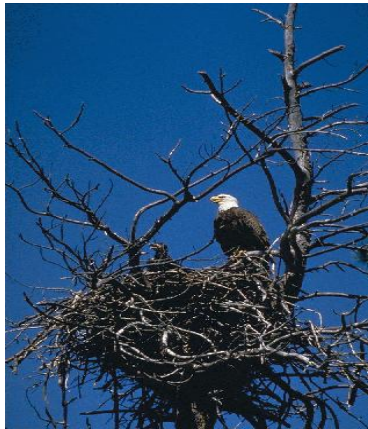


The Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for Michigan's Portion of the St. Marys River Area of Concern



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Purpose of the Biennial Remedial Action Plan Update

A Michigan Department of Environmental Quality (MDEQ) Biennial Remedial Action Plan (RAP) Update will be prepared at least every 2 years for each Area of Concern (AOC), and will be the primary tool for documenting and communicating progress to the public and agencies. These documents are meant to be brief, user-friendly updates on recent remedial actions and assessments in the AOC. They are prepared by the MDEQ in consultation with the Binational Public Advisory Council (BPAC), Ontario Ministry of the Environment (OMOE), Environment Canada (EC), and the U.S. Environmental Protection Agency (USEPA). These biennial RAP updates will also be posted on the AOC web site (MDEQ, 2006).

The biennial RAP update is one component of the MDEQ's process for tracking AOC restoration, removing Beneficial Use Impairments (BUIs), and ultimately delisting AOCs. These processes and relevant restoration criteria are described in more detail in the MDEQ's *Guidance for Delisting Michigan's Great Lakes Areas of Concern (Guidance)* (MDEQ, 2006).

The purpose of this St. Marys River biennial RAP update is to track progress on the Michigan portion of the AOC by providing an update on those remedial actions completed in recent years, and BUI assessment results that are based on the readiness of a BUI removal and subsequent technical committee review. The Appendix highlights some of the recent remedial activities that have been completed in Canada's portion of the St. Marys River AOC. Some of these activities have had, or are likely to have, an impact on restoring beneficial uses in Michigan's portion of the AOC. Comprehensive background information is provided in the 1992 and 2003 St. Marys River RAP documents (OMOE and Michigan Department of Natural Resources [MDNR], 1992; EC, USEPA, OMOE, and MDEQ, 2002).

How to Use this Document

For each of the 10 BUIs in the St. Marys River AOC, this biennial RAP update includes:

- A description of the significance of the BUI based on previous RAP documentation
- A summary of the restoration criteria for the BUI outlined in the *Guidance* document
- A brief summary of relevant remedial actions, if any, completed in recent years. Highlights of recent remedial activities completed in Canada's portion of the AOC are outlined in the Appendix
- A brief summary of the technical committee's assessment activities and results, if any, completed in recent years
- A list of annotated references and studies that may be used by a technical committee when the MDEQ AOC coordinator, in consultation with the BPAC, determines the BUI is ready for formal review of remedial actions and restoration according to the applicable criteria.

Introduction

Background

In 1987, amendments to the Great Lakes Water Quality Agreement (GLWQA) were adopted by the federal governments of the U.S. and Canada. Annex 2 of the amendments listed 14 BUIs which are caused by a detrimental change in the chemical, physical, or biological integrity of the Great Lakes system (International Joint Commission, 1988). The Annex directed the two countries to identify AOCs that did not meet the objectives of the GLWQA. The RAPs addressing the BUIs were to be prepared for all 43 AOCs identified, including the St. Marys River. The BUIs provided a tool for describing effects of the contamination, and a means for focusing remedial actions.

The 1992 St. Marys River RAP identified nine of the GLWQA's 14 beneficial uses as being impaired (OMOE and MDNR, 1992). The 2003 RAP document stated that the Bird and Animal Deformities or Reproductive Problems BUI required further assessment. However, because researchers found three cross-bill common tern chicks out of 120 birds sampled on Lime Island in 1998 in the Michigan portion of the river (EC et al., 2002), the MDEQ included this beneficial use as a tenth BUI and will assess its restoration status using the *Guidance* criteria (EC et al., 2002). Table 1 is a matrix for tracking the progress of assessments and removal of the listed BUIs for the St. Marys River AOC. These BUIs were primarily listed due to industrial and municipal point sources, combined sewer overflows (CSOs) discharging conventional pollutants (e.g., phosphorus), heavy metals, bacteria, and trace organics. These inputs resulted in contaminated sediments, fish consumption advisories, and impacted biota (OMOE and MDNR, 1992; EC et al., 2002).

Table 1. The St. Marys River AOC BUI Removal Matrix.			
Beneficial Use Impairment	Beneficial Use Remains Impaired	Assessment in Progress	BUI Removed
Restrictions on fish and wildlife consumption	x		
Fish tumors or other deformities	x		
Bird or animal deformities or reproductive problems	x		
Degradation of benthos	x		
Restrictions on dredging activities	x		
Eutrophication or undesirable algae	x		
Beach closings	x		
Degradation of aesthetics	x		
Degradation of fish and wildlife populations	x		
Loss of fish and wildlife habitat	x		

The St. Marys River AOC boundary (Figure 1) includes the area of the river which extends from Whitefish Bay between Point Iroquois, Michigan and Gros Cap, Ontario; east and downstream between Quebec Bay and Humbug Point, Ontario in the St. Joseph Channel; between the Michigan side of the river and St. Joseph Island, downstream to the De Tour Passage, Michigan (EC et al., 2002).



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Restrictions on Fish and Wildlife Consumption

Significance in the St. Marys River Area of Concern

In Michigan waters of the St. Marys River, contamination mainly due to mercury and polychlorinated biphenyls (PCBs) has resulted in Michigan Department of Community Health (MDCH) issuing fish consumption advisories for various sizes of walleye, northern pike, and carp (MDCH, 2004). Fish consumption advisories also have been issued for migratory fish, including trout and salmon species, captured in the St. Marys River (OMOE and MDNR, 1992). The *Guide to Eating Ontario Sport Fish* gives consumption advice for sport fish from Ontario waters and is published every other year by the OMOE in cooperation with the Ministry of Natural Resources (OMOE, 2005).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies (i.e., MDEQ, EC, OMOE, and USEPA) will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Bohr, J. and J. Zbytowski. 2006. Michigan Fish Contaminant Monitoring Program: 2005 Annual Report. MDEQ-WB Report #MI/DEQ/WB-06/091.
<http://www.deq.state.mi.us/documents/deq-wb-sw-as-fcmreport2005.pdf>

The MDEQ's fixed station whole fish contaminant trend monitoring project was initiated to measure spatial and temporal trends of certain bioaccumulative contaminants.

Michigan Department of Community Health. 2004. Michigan Family Fish Consumption Guide: Important Facts to Know if You Eat Michigan Fish.
http://www.michigan.gov/mdch/1,1607,7-132-2944_5327-13110--00.html

Certain kinds and sizes of fish from the Great Lakes, and some Michigan lakes and streams, contain levels of toxic chemicals that may be harmful if those fish are eaten too often. The MDCH advises caution about eating Michigan fish for the general population, women of childbearing age, and children under 15 years old.

Fish Tumors or Other Deformities

Significance in the St. Marys River Area of Concern

An investigation conducted in the late 1990's by the U.S. Fish and Wildlife Service (USFWS) indicated that the incidence of liver tumors in brown bullheads from Munuscong Bay was higher than would be expected for a control site (Smith, Portt, and Rokosh, 1990, as cited in EC et al., 2002). An explanation for the cause of the tumors could not be determined at that time. In addition, white suckers sampled on the Canadian side of the St. Marys River exhibited liver tumor prevalence in excess of 9%, likely associated with exposure to chemical contaminants, such as polycyclic aromatic hydrocarbons (PAHs) in contaminated sediments (OMOE and MDNR, 1992; EC et al., 2002).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

No known reports or studies were available to include in this Update.

Bird or Animal Deformities or Reproductive Problems

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, there were limited data on contaminant concentrations in birds or mammals of the St. Marys River AOC (OMOE and MDNR, 1992). Prior to 1992, concentrations of contaminants (e.g., PCBs) in herring gull eggs from Lake George, while elevated, were typical of other areas of the Great Lakes, including Lake Superior (OMOE and MDNR, 1992). However, the highest PCB concentration measured in common tern eggs from the lower river was in the range that could produce harmful effects in eggs. In 1998, Michigan State University researchers found three cross-bill common tern chicks out of 120 birds sampled on Lime Island (EC et al., 2002).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Senthilkumar, K. Bowerman, K. Millenbah, D. Best, T. Takasuga, and S. Masunaga. 2004. Polychlorinated-Dibenzo-P-Dioxins/Furans and-Dioxin-Like Biphenyls in Eggs of Common Terns From Lime Island, St. Marys River, Michigan, USA. *Toxicological and Environmental Chemistry* 85(4):221-232.

This study determined that the population collapse of common tern from Lime Island in the St. Marys River, Michigan, were related to the 2,3,7,8-chlorine substituted dioxins, furans, dioxin-like PCBs, and other possible factors using unhatched egg target contaminant analysis.

Degradation of Benthos

Significance in the St. Marys River Area of Concern

Benthic community health on the Michigan side of the St. Marys River AOC appears to be relatively good. There are slight to moderate benthic impairments along the north side of Sugar Island in the Lake George Channel, likely due to organic enrichment from upstream sources, and at the Cannelton Industries site due to chromium and mercury from the historic tannery operation (EC et al., 2002 and Golder Associates, Ltd., 2004). According to the RAP documents, benthic communities are severely to moderately impaired along the Sault Ste. Marie, Ontario shoreline, specifically downstream from Algoma Steel, Bellevue Marine Park, St. Marys Paper, and the East End Waste Water Treatment Plant (WWTP) (OMOE and MDNR, 1992; EC et al., 2002). These impairments are mainly due to sediments contaminated with metals, organic matter (e.g., pulp fiber), and PAHs (Golder Associates, Ltd., 2004).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

The Cannelton Industries site is a former tannery located adjacent to Tannery Bay on the south shore of the St. Marys River, upstream from the city of Sault Ste. Marie, Michigan. Remedial investigation in the 1990's at the tannery site and bay indicated that sediments and wetland areas contained organic material contaminated with chromium and mercury. As a result, these areas were designated as a USEPA Superfund site under the Comprehensive Environmental Response, Compensation and Liability Act. The USEPA approved a remedy for site clean up that included remediation of the tannery waste in the upland areas and placement of a shoreline rock barrier to keep any remaining waste from eroding into the bay. The remedial action plan for the bay area called for natural recovery, allowing clean silt from St. Marys River to gradually cover the contaminated sediment. All remedial work under the Superfund program was completed in 1999. Environmental monitoring was to be performed indefinitely to monitor the natural recovery process.

However, after purchasing the tannery site, Phelps Dodge Corporation along with the city of Sault Ste. Marie, the BPAC, and the state of Michigan, expressed a preference for sediment removal instead of waiting for natural recovery. An application was submitted in 2004, and subsequently accepted for Great Lakes Legacy Act funding. In September 2006, USEPA, MDEQ, and Phelps Dodge Corporation began a project to dredge approximately 40,000 cubic yards of contaminated sediment from the bay and soil from two small mercury-impacted wetland areas. Dredging should be completed in 2007 and is expected to eliminate approximately 500,000 pounds of chromium and 25 pounds of mercury from the St. Marys River.

Though not included in any RAP documentation, Consumer's Energy initiated environmental cleanup work in 1998 at the decommissioned Manufactured Gas Plant (MGP) site, located downstream of Sault Edison power plant on the Michigan side of the river, to address pockets of coal tar and contaminated soils which were a potential source of benzene, toluene, ethylbenzene, xylene, PAH, and metals contamination to the river. Land based interim response actions through 2004 removed approximately 16,500 tons of contaminated soils and coal tar from the MGP site. Remedial investigations in the river itself commenced in 2004 and an interim response action to remove contaminated sediment and free phase coal tar was completed in 2005. The first phase of the river work focused on the shallow water sediments and the removal of a pier which had contamination located beneath it. Dredging removed approximately 7,500 cubic yards of contaminated sediments and tar from the river.

During confirmation work of the dredged area in the spring of 2006, an additional tar pocket was discovered in a near shore area and was removed at that time. In addition to the dredging activity, the shoreline was stabilized with rip-rap to complete the land based interim response actions. These interim response actions completed the first phase of tar removal in the shallow water area of the river of the MGP site. The second phase of the project will address tar found near the edge of the shipping channel, in the faster current and deeper area of the site. It has not been determined what actions need to be taken to address the tar near the navigational channel (S. Schaefer, personal communication, December 19, 2006).

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Back, R. and B. Keller. 2005. Current Sediment Quality in the St. Marys River AOC (MI:USA). Final Report for USEPA-GLNO Grant #: GL2002-054.

This project sought to revisit and update sediment contaminant data regarding a variety of sediment locations within the St. Marys River that were previously identified in the St. Marys River Stage 1 RAP. The primary focus was on surficial sediment contamination, particularly metals shown to be elevated during previous sampling events. Sediment core samples were also collected within these areas to assess the spatial distribution of the metal contaminants.

STS Consultants. 2001. Interim Response and Remedial Investigation Report.

STS Consultants. 2003. Off Site Interim Response and Sediment Investigation Report.

STS Consultants. 2004. Phase III Sediment Investigation Report.

STS Consultants. 2005. Phase IV Phase V Investigation Report.

The above sediment investigation reports provide documentation of visual and laboratory analyses, and characterization of various types of sediment samples collected at the MGP site.

Restrictions on Dredging Activities

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, uncontaminated dredge spoils from the navigation channel have always been approved for open water disposal (OMOE and MDNR, 1992). However, sediments from several navigational portions of the St. Marys River have been documented as exceeding USEPA's Guidelines for Pollution Classification of Great Lakes Harbor Sediments and/or OMOE's Provincial Sediment Quality Guidelines for Open Water Disposal of Dredged Spoils disposal guidelines. Areas documented as exceeding these guidelines included: Algoma Slip, Algoma Slag Dump, Lake George Channel, Little Lake George, the northern half of Lake George, Tannery Bay, the head of the St. Joseph and West Neebish Channels, and Lake Munuscong (EC et al., 2002).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

The U.S. Army Corps of Engineers (USACE) conducts pre-maintenance surveys for metals, PCBs, and organic compounds every ten years, and dredges the St. Marys River navigational channel every ten years. The most recent pre-maintenance survey and dredging activities occurred in 2001. The pre-maintenance survey found no detectable levels of PCBs in the navigational channel. Dredging was performed by hydraulic dredging, and no dredging restrictions were placed on the contract (P. Horner, personal communication, December 15, 2006).

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Great Lakes Dredging Team. 1999. Decision Making Process for Dredged Material Management. Draft Final, October 13, 1998, Amendment #1, January 18, 1999.

This document describes how to manage the dredged material, management options, treatment technologies available, the technical evaluation process, and regulatory information.

U.S. Army Corps of Engineers. 2001. Sediment Sampling, Lower St. Marys River, Sault Sainte Marie, Michigan. Final Report.

USACE contractors conduct pre-maintenance dredging surveys of the St. Marys River navigational channel. The surveys involve the collection of sediment and water samples at selected stations for analysis of physical and chemical parameters.

Eutrophication or Undesirable Algae

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, the open waters of the St. Marys River are typical of the oligotrophic trophic status of Lake Superior. However, some embayments and other slow moving portions of the river have been impaired by the presence of floating algal mats (OMOE and MDNR, 1992).

Provincial guidelines for phosphorus have been exceeded in the Lake George Channel downstream from the East End WWTP (EC et al., 2002). The addition of phosphorus from the East End WWTP is believed to be the major cause of the rapid algal growth in the channel, which has resulted in a number of citizens' complaints on both sides of the channel.

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

In 2004, the Chippewa/East Mackinac Conservation District began a Sault Ste. Marie Area Watershed Planning project. The assessment area included approximately 15,000 acres, encompassing several small sub-watersheds of the St. Marys River and creeks within the city of Sault Ste. Marie, Michigan. The project identified and assessed pathogens (e.g., *E. coli*), cultural eutrophication (i.e., human-caused inputs of excess nutrients), and other environmental pollution impacts to the water quality of the St. Marys River. The results of the project were used to develop a watershed plan for the Sault area, which recommends actions to alleviate the identified impairments to the river. The watershed plan is currently under final review by the MDEQ (B. Sweet, personal communication, December 15, 2006).

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Great Lakes Environmental Center and LimnoTech, Incorporated. 2006. Great Lakes Connecting Channels Data Evaluation and Trend Analysis Report. Report #MI/DEQ/WB-06/092.
http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-32361--,00.html

The MDEQ has conducted monitoring to determine the ambient water quality conditions in Michigan's portion of the connecting channels of the Great Lakes since 1969 in the Detroit River, and since 1998 in the St. Clair and St. Marys Rivers. The monitoring was designed to document water quality, calculate loading rates and determine water quality trends over time.

Beach Closings

Significance in the St. Marys River Area of Concern

According to the RAP documents, high bacterial densities downstream of CSOs, storm sewers, industrial outfalls, and the East End WWTP have been documented (OMOE and MDNR, 1992; EC et al., 2002). Periodic advisories against swimming and bathing have been issued on the Michigan side of the river.

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

In 1995, Sault Ste. Marie, Michigan, initiated a 25 year, five phase project to eliminate CSOs. This project is being funded by low-interest loans from the State of Michigan Revolving Loan Fund. Currently, the City's sewer separation is ahead of the schedule stipulated in the National Pollutant Discharge Elimination System (NPDES) discharge permit (R. Conroy, personal communication, December 8, 2006).

See the Eutrophication or Undersirable Algae section above for recent remedial actions completed in the Michigan waters of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

MDEQ's beach website: <http://www.deq.state.mi.us/beach/public/default.aspx>

The MDEQ awards grants each year to local health departments to monitor *E. coli* levels at Great Lakes and inland beaches. County health departments use the results to assess whether the total body contact recreation designated use is being attained and whether beach closings are necessary. Results are reported in annual beach monitoring reports and are posted on the MDEQ's beach website above (Edly and Wuycheck, 2006).

CSO & Sanitary Sewer Overflow (SSO) Discharge website:

http://www.deq.state.mi.us/csosso/find_event.asp

Facilities are required to report that a CSO and SSO discharge event occurred within 24 hours of the initial discharge. Later, after the event ends, a written report is submitted which contains additional information including volume of the discharge, and the start/end date and time. This information is posted on the above website.

Degradation of Aesthetics

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, nuisance levels of floating material have been periodically reported along the north shore of Sugar Island in the Lake George Channel (OMOE and MDNR, 1992). In addition to nuisance floating scum, the East End WWTP and Algoma Steel were identified as the major point sources contributing to over 88 percent of the oil and grease to the river, followed by St. Marys Paper (EC et al., 2002).

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

No recent remedial actions relative to Degradation of Aesthetics have taken place in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Great Lakes Environmental Center and LimnoTech, Incorporated. 2006. Great Lakes Connecting Channels Data Evaluation and Trend Analysis Report. Report #MI/DEQ/WB-06/092.
http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-32361--,00.html

The MDEQ has conducted monitoring to determine the ambient water quality conditions in Michigan's portion of the Connecting Channels of the Great Lakes since 1969 in the Detroit River, and since 1998 in the St. Clair and St. Marys Rivers. The monitoring was designed to document water quality, calculate loading rates and determine water quality trends over time.

Loss of Fish and Wildlife Habitat Degradation of Fish and Wildlife Populations

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, fish and wildlife habitat on both sides of the river has been substantially altered and/or eliminated by the construction of the U.S. and Canadian navigation locks, vessel traffic, compensating works at the head of the St. Marys River rapids, hydro facilities, shoreline filling and dredging activities (OMOE and MDNR, 1992). Pollutant loadings from industrial sources, municipal discharges, and urban runoff into inner-city tributaries (e.g., Ashman, East Davignon and Fort Creeks) have also impacted sediment quality and benthic habitat on both sides of the river.

Although the sport fishery is considered to be healthy in general, populations of lake herring and lake whitefish in the lower river have decreased (OMOE and MDNR, 1992). In addition, the St. Marys River has been recognized as the main source of sea lamprey in Lake Huron, accounting for approximately 50 percent of the annual mortality of adult lake trout (EC et al., 2002).

The USFWS, Sea Lamprey Control Program, with funding from the Great Lakes Fishery Commission (GLFC), conducts treatments of the river and is continuing to work with other agencies and partners to develop proposals for actions that will address the sea lamprey problem in Lake Huron and its tributaries, including the St. Marys River. Because sea lamprey is a long-term, lake-wide concern that is currently being addressed by other programs, it may not be addressed under the AOC program.

Restoration Criteria

The 2002 Stage 2 RAP document identified water use goals and criteria for removal of each BUI listed for the St. Marys River AOC (EC et al., 2002). However, not all of the criteria were specific enough to determine restoration success. Therefore, criteria for removal of each BUI will need refinement by relevant agencies to be specific and measurable. Early in 2007, the Four-Party Agencies will provide guidance to the bi-national AOCs on an approach to the refinement process. The BPAC will be consulted in the process for finalizing BUI removal criteria for the AOC.

Remedial Actions

Since 2004, LSSU has been involved in a three-year project to determine the ecosystem health of the St. Marys River. The LSSU researchers are investigating coastal marshes to determine the status of habitat and the wildlife by collecting biological samples and performing chemical analyses of biota throughout the river.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI.

Annotated References and Studies

Fielder, D., D. Borgeson, A. Bowen, S. Koproski, S. Greenwood, and G. Wright. Population Dynamics of the St. Marys River Fish Community 1975-2002.

This study provides an overall status of five resident species of particular interest to anglers based on surveys conducted from 1975 to 2002 in the St. Marys River. Data collected includes abundance, growth, mortality, and size structure.

Gebhardt, K., D. Fielder, S. Greenwood, H. Robbins, and T. Sutton (Editors). St. Marys River Fisheries Assessment Plan. Great Lakes Fisheries Commission, Special Report.

Greenwood, S., K. Gebhardt, D. Fielder, H. Robbins, and T. Sutton (Editors). 2001. Towards a Fisheries Assessment Plan – Background Information, Stakeholder and Agency Consultation. Great Lakes Fisheries Commission, Special Report.

This St. Marys Fisheries Assessment planning reports provide a standardized approach for regular assessment of the river's fishery and aquatic resources. Included are approaches for fish community assessment, fish harvest estimates and reporting, lower trophic level monitoring, and habitat mapping and data collection. The plan is intended to serve as a mutual and coordinated approach to assessment for agencies and academia. Findings resulting from such surveys will enable a coordinated management strategy to move towards a common objectives through the GLFC's Lake Huron Committee.

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Appendix: Canada/Ontario Remedial Activities

- The East End WWTP discharged primary effluent into the St. Marys River since 1959. In 2000, the City Council Sault Ste. Marie, Ontario approved a 20-year plan to upgrade sanitary sewage infrastructure to reduce basement flooding and overflows to the river and improve the East End WWTP. This is the largest single capital works project that the city of Sault Ste. Marie, Ontario has ever undertaken. The upgraded plant is now a state-of-the-art facility utilizing biological nutrient removal for secondary treatment, the first of its kind in Ontario. Once complete, this project will result in a major improvement to effluent being discharged to the river.

<http://www.city.sault-ste-marie.on.ca/cler/NewsReleases2006/East%20End%20Wastewater%20News%20Release.htm>

- Sault Ste. Marie, Ontario separated the majority of its combined sewers in the 1960's. The last known combined sewer overflow was separated in 2002. Even though the Ontario systems are separate, occasional wet weather events overload the system due to pipe infiltration and connection of foundation drains. The project to eliminate foundation drain connections to sanitary sewers is on-going. In 2002, in an effort to address infiltration and high-flow events, the city of Sault Ste. Marie, Ontario constructed a sanitary sewer overflow tank at Bellevue Park to collect the high sanitary flows temporarily, and once the high-flow event has passed, pump the sewage to the East End WWTP.

<http://www.city.sault-ste-marie.on.ca/cler/NewsReleases2006/East%20End%20Wastewater%20News%20Release.htm>

- In 2001, Algoma Steel voluntarily signed a five-year Environmental Management Agreement (EMA) with OMOE and EC. Since 1990, Algoma Steel has made several environmental improvements (e.g., upgrades to coke oven) and projects to reduce contaminant loadings into the river. Significant activities include working towards virtually eliminating its PCB and mercury holdings, reducing benzene and PAH air emissions, monitoring contaminant loading from the Algoma landfill to the river, and dredging the Algoma boat slip. The EMA and semi-annual reports are available at: www.ec.gc.ca/epa-epe/Algoma/en/index.cfm.

- As part of the Canada Ontario Agreement (COA), a Sediment Assessment Decision Making Framework was developed to provide a step-by-step science-based guidance for assessing risks posed by contaminated sediment. The framework identifies all possible sediment assessment outcomes based on four lines of evidence, including: sediment chemistry, toxicity to benthic invertebrates, benthic community structure, and the potential for biomagnification. Once fully implemented in Canada's portion of the St. Marys River AOC, the framework will provide a mechanism for identifying contaminated sediments of greatest concern and a direction on the next steps in making sediment management decisions.

www.ene.gov.on.ca/.../er/documents/2006/COA%20sediment%20decision%20making%20FINAL%20REPORT%202005.pdf

- The Government of Canada's Great Lakes Sustainability Fund (GLSF) provides funding and technical support to local agencies in to support actions to restore AOCs. From 1990 to 2005, the GLSF has contributed \$1.8 million (Canadian) toward 11 projects to restore the St. Marys River AOC. Projects included habitat rehabilitation; sediment assessments and remediation; studies to encourage innovative, cost-effective municipal wastewater treatment technologies for sewage, CSOs, and stormwater runoff. This funding was matched with \$2.7 million (Canadian) from partners.
- Over the past five years, EC has spent more than \$250,000 (Canadian) on sediment related work with matching funds from its partners. This work includes assessing sediment chemistry, toxicity, benthic community assessments, bioaccumulation, fish health, and sediment stability. Data gaps from this work are currently being filled in order to assess the findings against the COA sediment assessment process.
- The GLSF funded a project by Ducks Unlimited Canada during 2002-2005 to seek long-term protection for wetlands along the St. Marys River. The project marketed funding instruments (e.g., EcoGifts, Land Tax Incentive Programs), negotiated land use agreements and influenced municipal planning development. Coastal wetland results included detailed evaluation of approximately 3,000 hectares (ha), protection of over 500 ha through conservation agreements and landowner tax incentive programs, mapping and verification of over 10,000 ha, and the establishment of a Lake George wetland interpretive site.

http://www.on.ec.gc.ca/water/raps/report_2003/StMarys_e.html